

CLAIMS

What is claimed is:

1. A method of managing radiation, the method comprising:
 - providing a semiconducting device having a two-dimensional carrier gas;
 - exciting the carrier gas using a laser pulse having a duration of approximately one femtosecond to ten picoseconds; and
 - adjusting a frequency of the radiation using a voltage applied to the semiconducting device.
2. The method of claim 1, wherein the radiation comprises at least one of: terahertz radiation and microwave radiation.
3. The method of claim 1, wherein the adjusting step adjusts at least one of: a gate bias voltage, and a drain bias voltage.
4. The method of claim 1, wherein the semiconducting device comprises at least one of: a heterodimensional diode, a field effect transistor array, a heterodimensional diode array, and an array of rectifying contacts.
5. The method of claim 1, wherein the semiconducting device comprises a field effect transistor.
6. The method of claim 5, wherein the field effect transistor includes a periodic grating gate.

7. The method of claim 1, wherein the exciting step includes shining the laser pulse onto at least one of: a top side and a bottom side of the semiconducting device.

8. A method of generating radiation using a field effect transistor, the method comprising:
 shining a laser pulse onto the field effect transistor; and
 adjusting a frequency of the radiation by adjusting a carrier density of carriers in a channel of the field effect transistor.
9. The method of claim 8, wherein the laser pulse is shone onto at least one of: a top side and a bottom side of the field effect transistor.
10. The method of claim 8, wherein the field effect transistor comprises a transparent gate, and wherein the laser pulse is shone onto the transparent gate.
11. The method of claim 8, wherein the adjusting step uses a bias voltage applied to a gate of the field effect transistor.
12. The method of claim 11, wherein the gate comprises a periodic grating gate.
13. The method of claim 8, wherein the radiation comprises at least one of: terahertz radiation and microwave radiation.
14. The method of claim 8, wherein the laser pulse has a duration of approximately one femtosecond to ten picoseconds.

15. A method of generating radiation using a heterodimensional diode, the method comprising:
shining a laser pulse onto at least one of a top side and a bottom side of the

heterodimensional diode; and

adjusting a frequency of the radiation using a voltage applied to the heterodimensional diode.

16. The method of claim 15, further comprising adjusting the frequency of the radiation by using a plurality of heterodimensional diodes.

17. The method of claim 15, further comprising shining a second laser pulse onto a substrate of the heterodimensional diode.

18. The method of claim 15, wherein the laser pulse has a duration of approximately one femtosecond to ten picoseconds.

19. The method of claim 15, wherein the adjusting step comprises adjusting a width of a depletion region formed in the active layer.

20. The method of claim 15, wherein the heterodimensional diode includes at least one ohmic contact and at least one rectifying contact.